

Description of the Six-foot Integrating Sphere, Hardy

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This document describes the state of the six-foot integrating sphere source, known as Hardy, located at the NASA GSFC Code 920.1 Calibration Facility.

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The integrating sphere source consists of two hollow laminated fibreglas hemispheres. The rear hemisphere is mounted to the front hemisphere by hinges on one side and secured on the other by a latch (Figure 1). The front hemisphere is mounted to the support frame.



Figure 1 - The Hardy Source System.

The front hemisphere also has a 10" diameter exit aperture mounted at the hemisphere midpoint (represented by the black circle in Figure 2). Inside the sphere, sixteen (16) 200-watt quartz tungsten halogen lamps, GE type Q6.6A/T4/5CL, are mounted symmetrically around the exit port (represented by the dashed circle in Figure 2).

A single conical section aluminum baffle is mounted so that light from the lamps does not directly exit the sphere. Several coats of BaSO₄ cover the sphere interior and the conical baffle, providing a highly diffuse and reflective surface.

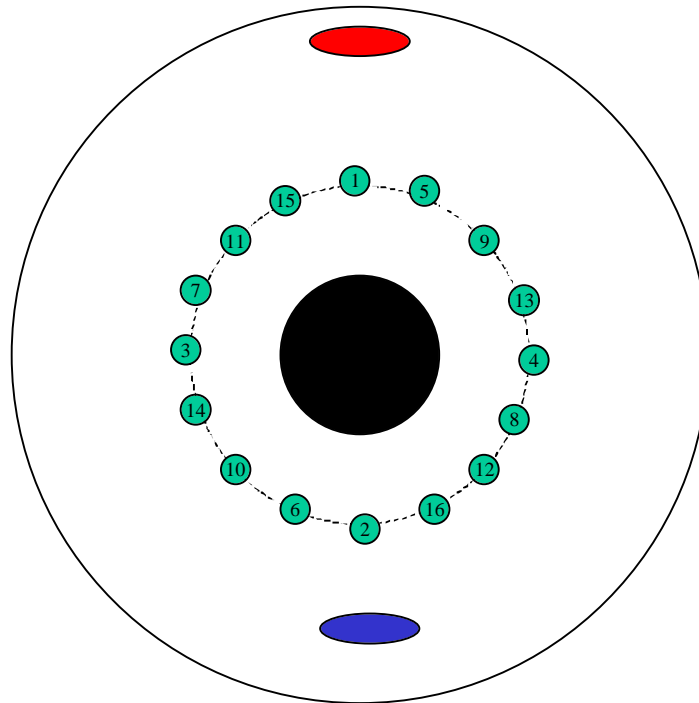


Figure 2 - General Arrangement

Sixteen 200-watt lamps (represented by the green circles in Figure 2) produce a great quantity of heat. To remove some of the heat, and to reduce temperature variations which may affect the calibration, a baffled exhaust vent is located at the top of the rear hemisphere (the red oval in Figure 2). This exhaust vent is connected to the building exhaust ventilation system. Additionally, a baffled inlet vent is located below the exit aperture on the front hemisphere (the blue oval in Figure 2), providing a future connection for cooled, dehumidified air to be introduced into the sphere.

Each lamp (green circles in Figure 2) has a four-wire connection to the SSPS (Figure 3). This four-wire connection permits current control and current and voltage measurements on a per lamp basis. Since each SSPS power supply is 500W, two 200W lamps are connected to each power supply. To reduce illumination non-uniformity the lamps on each supply are on opposing aperture sides.



Figure 3 – Lamp Connection Panel

The inlet and exhaust baffles (Figure 4) are identical. They consist of an 8" diameter tube, in which are mounted three disks. The two outer disks have a cutout to provide ventilation. The disks are secured and separated by 1/2" standoffs. To minimize absorptive areas within the sphere, the disks and tube interior are coated with the same BaSO₄ coating as the sphere interior.

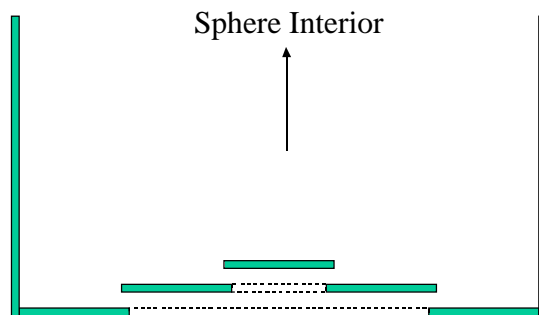


Figure 4 - Inlet & Exhaust Baffle Arrangement

Lamp power and sphere operational control is provided by the CF Standard Source Power System (SSPS). For information on the SSPS, please refer to that documentation, located on the CF Web site, <http://spectral.gsfc.nasa.gov/>.